

**MATURE STAGE EXPERIMENT**  
*Flight Pattern Descriptions*

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**Experiment/Module:** Gravity Wave Module

**Investigator(s):** Jun Zhang, David Nolan (U. Miami)

**Requirements:** Categories 2–5

**Mature Stage Science Objective(s) Addressed:**

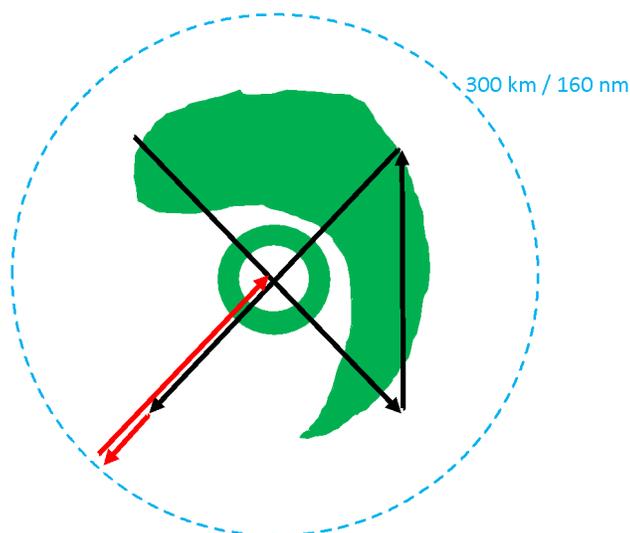
- 1) Collect observations targeted at better understanding internal processes contributing to mature hurricane structure and intensity change [IFEX Goals, 1 3]

**P-3 Pattern 1 (Internal Processes):**

**What to Target:** Sample the inner core and near environments of the TC

**When to Target:** Any strength TC; no land restrictions. This module ideally should be conducted in quadrant with the least rainband activity, typically the upshear right or right-real quadrant. The best opportunity is at the end of a standard Figure-4 pattern, when the last leg terminates in a quadrant with less rainbands.

**Pattern:** Any standard P-3 pattern that provides symmetric coverage (e.g. Rotated Figure-4, Figure-4 Butterfly, etc.). At the end of the last leg, continue outward to distance of 160 n mi (295 km) from the center, or further if possible (see Fig. MA-1). Then turn the P-3 around and head directly back to the eye, retracing the previous leg in the opposite direction.



**Figure MA-1.** Depiction of the Gravity Wave module in which the P-3 flies an extended leg [160 n mi (295 km), red path] and reverses course along the same azimuth back to the eye

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**Flight altitude:** 10–12 kft or as high as possible

**Leg length or radii:** Leg lengths should extend to at least 160 n mi (295 km) from the center, or further if time permits, including the turn leg back the center.

**Estimated in-pattern flight duration:** ~40 min – 1 hr

**Expendable distribution:** Dropsonde and AXBTs are not a requirement

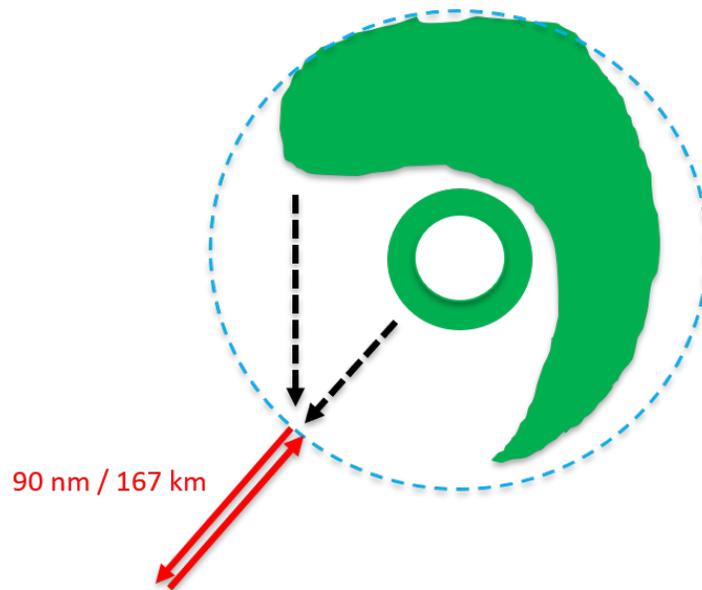
**Instrumentation Notes:** Use TDR defaults. Use straight flight legs as safety permits.

**P-3 Pattern 2 (Internal Processes):**

**What to Target:** Sample the inner core and near environments of the TC

**When to Target:** Any strength TC; no land restrictions. This module ideally should be conducted in quadrant with the least rainband activity, typically the upshear right or right-real quadrant. The best opportunity is at the end of a standard Figure-4 pattern, when the last leg terminates in a quadrant with less rainbands.

**Pattern:** Any standard P-3 pattern that provides symmetric coverage (e.g. Rotated Figure-4, Figure-4 Butterfly, etc.). At the end of the last leg (outbound or downwind leg), continue outward to distance of 90 n mi (165 km) from the end point, or further if possible (see Fig. MA-2). Then turn the P-3 around and head directly back to the eye, retracing the previous leg in the opposite direction to the end point before starting next radial leg or downwind leg.



**Figure MA-2.** Depiction of the Gravity Wave module in which the P-3 flies an extended leg (90 n mi) (red path) and reverses course along the same azimuth back toward the storm center.

## 2020 NOAA/AOML/HRD Hurricane Field Program - IFEX

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